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### **Understanding the Laminar Distribution of Tropospheric Ozone from Ground-based, Airborne, Space-borne, and Modeling Perspectives.**

Laminar ozone structure is a ubiquitous feature of tropospheric-ozone distributions resulting from dynamic and chemical atmospheric processes. Understanding the characteristics of these ozone laminae and the mechanisms responsible for producing them is important to outline the transport pathways of trace gases and to quantify the impact of different sources on tropospheric background ozone. In this study, we present a new method to detect ozone laminae to understand their climatological characteristics of occurrence frequency in terms of thickness and altitude. We employ both ground-based and airborne ozone lidar measurements and other synergistic observations and modeling to investigate the sources and mechanisms such as biomass burning transport, stratospheric intrusion, lightning-generated NO<sub>x</sub>, and nocturnal low-level jets that are responsible for depleted or enhanced tropospheric ozone layers. Space-borne (e.g., OMI, TROPOMI, TEMPO) measurements of these laminae will observe greater horizontal extent and lower vertical resolution than balloon-borne or lidar measurements will quantify. Using integrated ground-based, airborne, and space-borne observations in a modeling framework affords insight into how to gain knowledge of both the vertical and horizontal evolution of these ubiquitous ozone laminae.

#### **Authors**

- [Mike Newchurch](#)
  - University of Alabama in Huntsville
- [Matthew S Johnson](#)
- [matthew.s.johnson@nasa.gov](mailto:matthew.s.johnson@nasa.gov)
  - NASA Ames Research Center
- [Guanyu Huang](#)
  - University of Alabama in Huntsville
- [Shi Kuang](#)
  - Univ. of Alabama in Huntsville
- [Lihua Wang](#)
  - University of Alabama in Huntsville
- [Kelly Chance](#)
  - Harvard-Smithsonian
- [Xiong Liu](#)
  - Harvard-Smithsonian Center for Astrophysics